

May 19, 1959

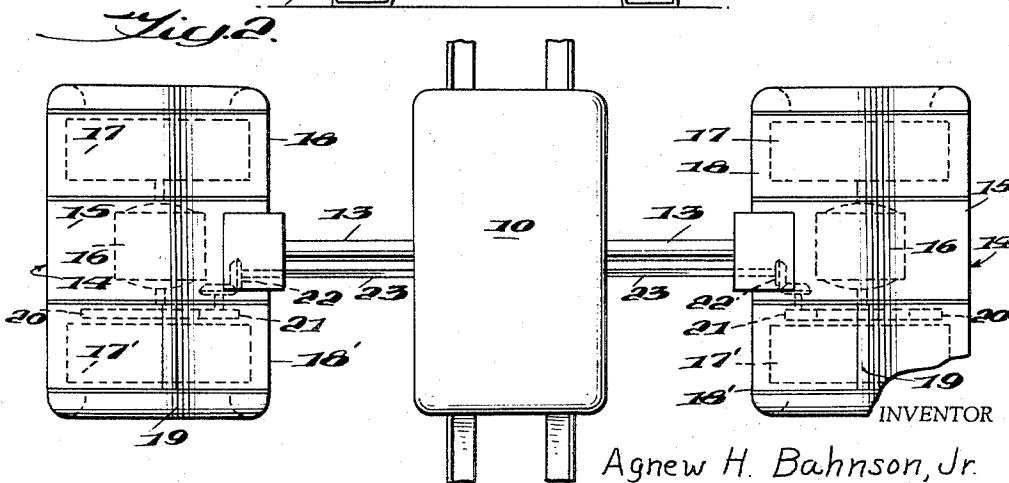
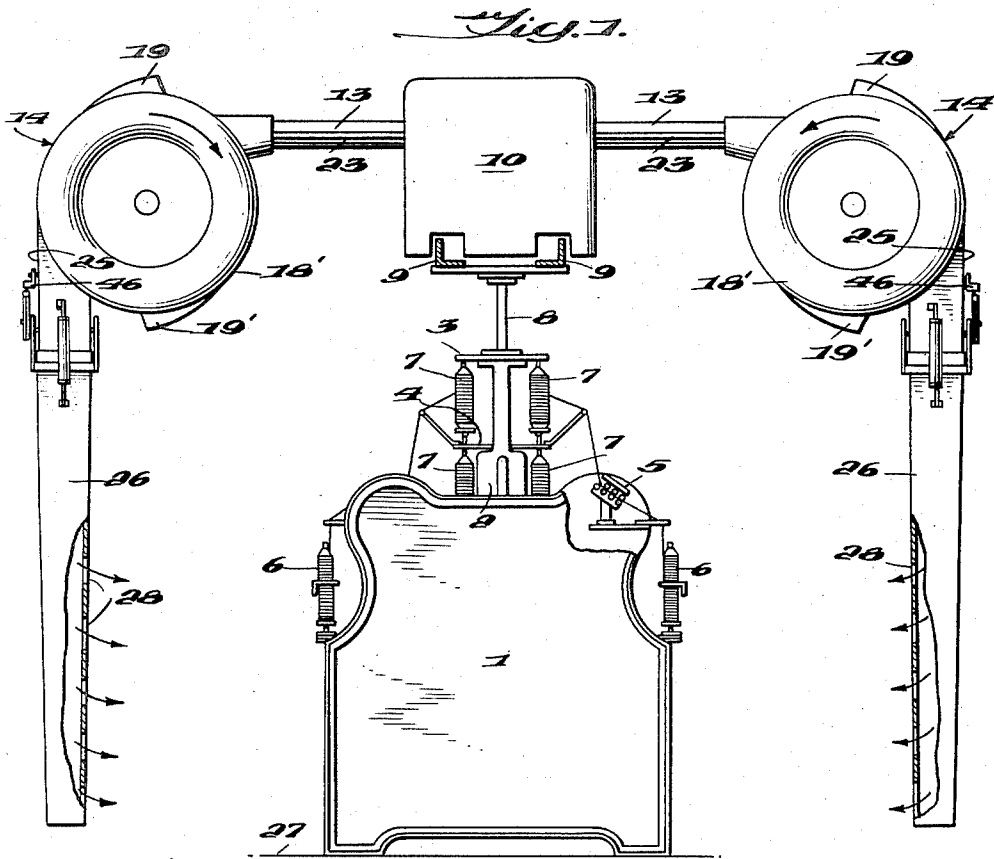
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2,886,843

TRAVELING CLEANER FOR TEXTILE MACHINES

Filed June 20, 1957

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

Fig. 3.

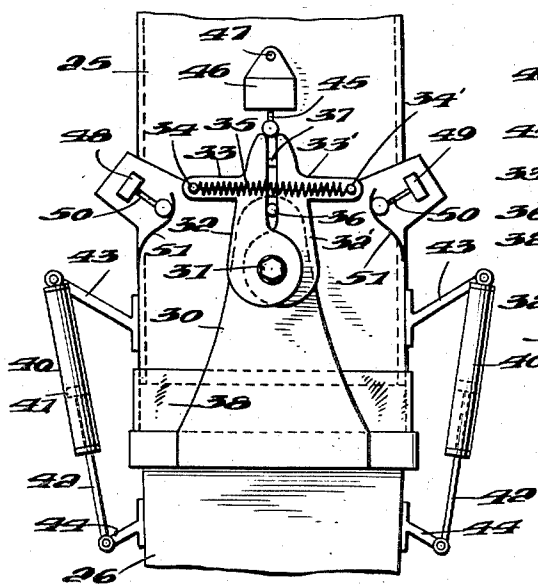


Fig. 4.

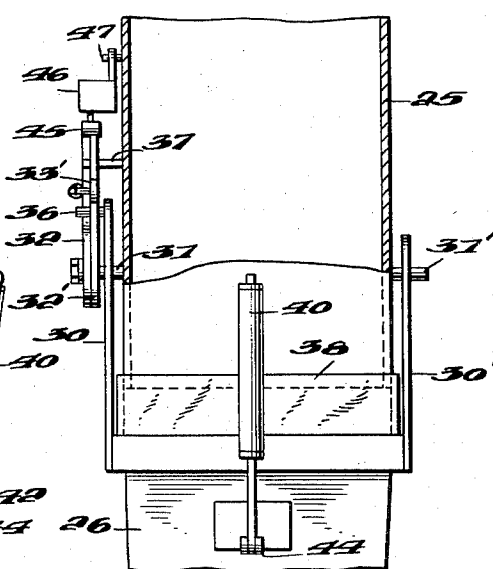


Fig. 5.

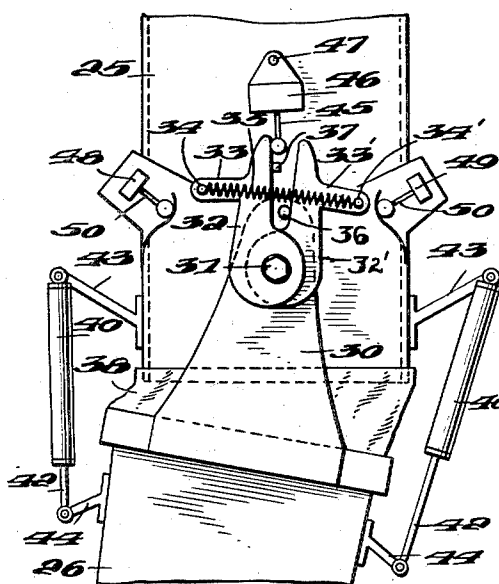
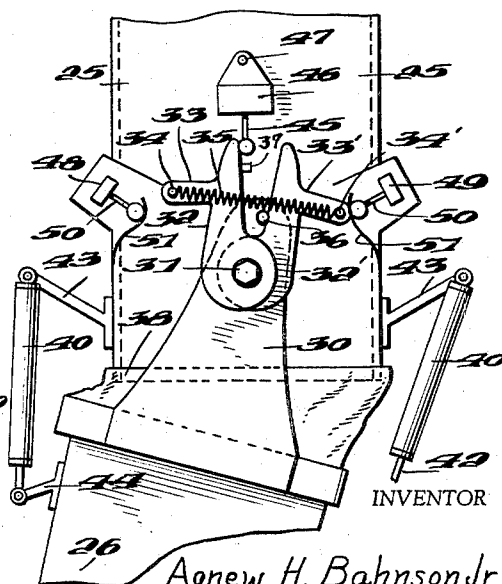


Fig. 6.



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1

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TRAVELING CLEANER FOR TEXTILE MACHINES

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Application June 20, 1957, Serial No. 666,860

7 Claims. (Cl. 15—312)

This invention relates to traveling cleaners of the air blast type and in particular to cleaners adapted to travel along textile machines such as spinning and drawing frames and the like for blowing off lint and other particles so as to prevent its accumulation on the surfaces of the frames. The cleaners are usually arranged to travel longitudinally of the frames at a level above the creel boards and this is usually high enough to pass safely over the heads of the spinners. However, with cleaners that have been heretofore designed the air blasts delivered by them downwardly against the frames have been unable to reach effectively into the lower portions of the frames. Consequently, it has been proposed to use a separate cleaner adapted to travel back and forth within the underframe. Another proposal has been to attach elongated air ducts to the overhead cleaner which extend downwardly at opposite sides of the cleaner, these ducts or trunks reaching almost to the floor and including air outlets directed inwardly towards the lower portions of the frame. The one disadvantage of these trunks is that they reach into the aisle itself between adjacent rows of frames and hence may strike against any obstruction there such as a cart or even a spinner or other personnel that may be standing in the aisle and fail to see the cleaner as it approaches. Thus there is danger of damage to equipment or injury to personnel. To overcome this difficulty, it has been proposed to make the depending air trunks of flexible material such as rubber thus permitting the trunk to yield when it strikes any obstruction in its path. This is not entirely satisfactory since the trunks may hang on an obstruction and possibly tear.

In accordance with the present invention, damage to equipment or injury to personnel is prevented by stopping the cleaner as soon as the depending air trunk strikes any the obstruction has been removed from the path of the obstruction and by restarting it automatically as soon as trunk.

More specifically, the traveling cleaner includes a self-propelled carriage supporting the blower units which establish the air blasts, the carriage being propelled by an electric motor. The depending air trunk is pivotally mounted to hang vertically so that as soon as it comes up against any obstruction it will swing about its pivoted support and this movement of the trunk serves to actuate switching means arranged in the control circuit of the motor which results in braking the carriage to a halt. As soon as the obstruction is removed and the trunk returns to a vertical position, the motor for propelling the carriage is automatically re-started in the same direction.

The invention will become more apparent from the following detailed description of two practical embodiments thereof and the accompanying drawings which illustrate them. In these drawings:

Fig. 1 is an end elevation of a traveling cleaner incorporating the invention with certain parts broken away;

Fig. 2 is a top plan view of the cleaner shown in Fig. 1;

Fig. 3 is a fragmentary view in side elevation drawn to

2

a larger scale of the upper, pivoted portion of the air trunk showing the trunk in its normal vertical position;

Fig. 4 is a view similar to Fig. 3 but taken at a right angle thereto;

Figs. 5 and 6 are views similar to Fig. 3 but showing the trunk in two positions after striking an obstruction;

Fig. 7 is a central longitudinal fragmentary section of the carriage member of the cleaner drawn to an enlarged scale and showing the tractor motor for propelling the cleaner along the overhead trackway and the motor for rotating the scrolls and nozzles on the two outboard centrifugal blowers;

Fig. 8 is a circuit diagram showing the manner in which the various motors including the traction motor are controlled in accordance with the angular position of the trunk; and

Fig. 9 is another circuit diagram similar to Fig. 8 but related to a modified embodiment for braking the traction motor and carriage to a standstill when the trunk strikes any obstruction in its path.

With reference now to the drawings, 1 represents the end of a textile processing machine such as a spinning frame having a creel board support 2, upper and lower creel boards 3, 4, a roll stand 5 extending longitudinally of the machine at each side thereof, spinning bobbins 6, roving bobbins 7 and a series of upstanding longitudinally spaced supports 8 for the track rails 9.

The traveling cleaner can be of various general designs and in the present embodiment is shown to include a self-propelled carriage 10 which, as indicated in Fig. 7, mounts a motor 11 that transmits its power through a reduction gearing to traction wheels 12 that run on rails 9. In the illustrated embodiments, motor 11 is of the reversible, three phase type and is energized via three conductor rails and pick-up shoes on the carriage, the conductor rails (not shown) extending along the track rails 9 as is conventional for overhead traveling cleaners, and the three phase power supply at 220 volts, 60 cycles being applied to the conductor rails.

Extending laterally outward from each side of the carriage 10 are support rods 13 and secured to the outer end of each of the rods 13 is a dual blower unit 14 of the centrifugal type. Each dual blower unit 14 includes a casing 15, a double-ended driving motor 16 connected to centrifugal impellers 17, 17' and scrolls 18, 18' surrounding the impellers. The scrolls 18' on the two blower units 14 include diametrically opposite, tangentially arranged outlets or nozzles 19, 19' for the air streams which serve to blow the lint off the upper portions of the machine 1 and each of these two scrolls 18 is arranged to be rotated about its axis by means of a drive chain 20, sprocket 21, bevelled gearing 22 and a drive shaft 23 which extends into the carriage 10 and is driven by another motor 24, see Fig. 7, mounted on the carriage. Thus as motor 24 drives the shafts 23, the scrolls 18' and their air outlet nozzles 19, 19' will be rotated in the directions indicated in Fig. 1 and thereby direct blasts of air inwardly against the roving bobbins 7, creelboards 3 and 4 and roll stands 5. Also, by rotating the scrolls 18', the blasts of air will also blow off the overhead and ceiling. The structural details of the blower do not per se form any part of the present invention but rather are more particularly disclosed and claimed in a co-pending application, Serial No. 570,895, filed March 12, 1956.

While the air blasts from the rotating nozzles 19, 19' are fully capable of blowing off the upper portion of the spinning frame 1, i.e. from the general level of the roll stands 5 upward, they do not reach into the so-called "underframe" portion below the roll stands 5. In order to satisfactorily blow off this portion of the frame, each of the scrolls 18, which is stationary, is arranged with a vertical tangential outlet duct 25 and the air

3

stream produced by the rotating impeller 17 passes downwardly through duct 25 into a normally vertically disposed tubular trunk 26 which reaches almost to the floor 27. The trunks 26 are closed at the bottom and include a row of vertically spaced air outlets 28 at the inner sides thereof, i.e. in the direction of the machine 1, and air streams issuing from the outlets 28 are directed to the lower portions of the machine such as the spinning bobbins 6 and other parts of the machine below the roll stands 5.

The blower units 14 are located at a level above the heads of the spinners and hence are able to travel above and along the rows of the machines 1 without interference. However, when the depending trunks 26 are added to the blower units, these trunks may reach almost to the floor and hence are liable to strike and injure the spinners who operate in the aisles between adjacent rows of machines. Also, the trunks may strike any other obstruction that may happen to be in the aisle such as a cart or the like. As indicated in the introductory portion of this description, one proposed solution for preventing injury to personnel or damage to equipment is to make the elongated duct or trunk from a highly flexible material such as rubber thus enabling the trunk to yield as it strikes an obstruction in its path. In accordance with the present inventive concept, the carriage is braked to a standstill as soon as the trunk strikes any object and is automatically re-started in the same direction as soon as the obstruction is removed. In a preferred embodiment, the depending trunk is made rigid in a longitudinal direction and mounted on the tangential outlet duct 25 for pivotal movement on the horizontal axis transverse to the rails 9, i.e. transverse to the direction of travel of the carriage 10. Should either of the rigid trunks strike any obstruction it will be moved about its pivotal support from its normal vertical attitude and this movement serves to brake the carriage to a stop. As soon as the obstruction is removed the carriage restarts itself in the same direction.

With reference now to Figs. 3-6, it will be seen that each trunk is provided at its upper end with upstanding ears 30, 30' at opposite sides thereof which are pivotally mounted upon horizontal stub shafts 31, 31' extending transverse to the direction of travel of the trunk 26. Mounted rotationally upon stub shaft 31 are two arms 32, 32'. These arms include horizontal projections 33, 33' in alignment and which at their outer ends are provided with pins 34, 34' which form the anchoring points for opposite ends of a helical loading spring 35. Between the arms 32, 32' are two horizontal studs 36, 37 normally aligned vertically and in spaced relation. The lowermost of the two, i.e. stud 36 projects transversely outward from the upper end of the ear 30 and the uppermost stud 37 which is stationary projects transversely outward, and parallel with stud 36, from the side wall of duct 25. The spring 35 thus draws the upper ends of arms 32, 32' together against the fixed stud 37 and hence also against the stud 36 thus holding the latter in vertical alignment with stud 37 and hence normally holding the trunk 26 in a vertical attitude.

To prevent loss of air where the duct 25 joins the trunk 26, a rubber boot or sleeve 38 is used at the junction. Moreover, to prevent the trunk 26 from returning too quickly to its vertical position once the obstruction has been removed, it is preferred to use a pneumatic single-acting check device at each side of the trunk. As seen in Fig. 3, each check device includes a cylinder 40 and piston 41 connected to a piston rod 42. The cylinder is connected to the side of the air duct 25 by a bracket 43 and the piston rod 42 is connected to the corresponding side of trunk 26 by means of a bracket 44. Consequently, as the trunk 26 is moved in one direction or the other from vertical upon striking an obstruction, one of the pistons 41 is pushed into its cylinder 40 and the other piston 41 is simultaneously pulled out of its cylinder 40.

4

When the obstruction is removed, thus permitting the trunk 26 to move back to vertical, the piston 41 which had been pulled out of its cylinder 40 now is slowed pneumatically as it returns thus correspondingly slowing the vertical recovery movement of the trunk 26. The reason for providing this pneumatic check on the recovery movement is to prevent too quick an automatic restarting of the carriage 10 thus making it certain that the obstruction such as a spinner will have been cleared entirely out of the path of the trunk before it again starts to move.

It will be seen from Fig. 3 that the trunk 26 vertical, the upper ends of the arms 32, 32' cooperate to hold up the rounded end of a switch operator 45 for the contacts of a switch 46 mounted pivotally on duct 25 by means of a stud 47. In the raised position shown in Fig. 3, the contacts of switch 46 are closed. It will be remembered that each of the blower units 14 has a trunk 26. Consequently there are two of the switches 46 in the control circuit to be described. In addition to the switch 46, there are two other switches 48, 49 associated with each trunk. These are mounted on the duct 25 at opposite sides thereof and each switch includes a contact operator 50 and a supporting leaf spring 51 which lies in the path of the lateral extension 33 or 33' of the arms 32 or 32'. In the normal vertical position of the trunk, the contacts of the switches 48, 49 are closed but as one trunk or the other strikes any obstruction causing the trunk to tilt in one direction or the other from vertical, one or the other of the switch operators 50 will be actuated inwardly as shown in Fig. 6 thus opening the switch contacts and hence opening the circuit through the switch.

The details of the control circuit are shown in Fig. 8. Here it will be seen that the 220 volt, 3 phase power supply is indicated by lines A, B and C. Included in the circuit are the switches 46 for the two trunks arranged in series with and controlling the energization of the solenoid 52 of two pole relay R1. Also included are the two switches, 48, 49 for each trunk and these four switches are likewise arranged in series with and control energization of the solenoids 53, 54 of a pair of three pole relays R2 and R3.

The normally closed positions of the contacts of the six switches 46, 48, 48 and 49, 49, i.e. when the two trunks 26 are vertical, are indicated by the solid line positions of the switch blades, and the open positions of the switch contacts are indicated by the broken line positions of the blades. The circuit is completed by another two pole relay R4 with its solenoid 55, a reversing switch 56 which normally determines the running direction of the traction motor 11 and carriage 10 along the trackway 9, and an overload switch 57 individual to and associated in the energizing circuit of each of the impeller motors 16, 16, the scroll driving motor 24 and the traction motor 11. When the solenoids of the various relays R1 and R4 are unenergized, the contact operator positions are indicated by solid lines and when energized, the contact operator positions are indicated by the broken lines. The reversing switch 56 will normally stay in one position if the cleaner normally travels in the same direction around a closed or loop type of trackway in the spinning room so as to serve several rows of machines in the spinning room, or it will be periodically moved to one position and then the other as the cleaner reaches the opposite ends of a row of machines when the cleaner has a reciprocating motion over a single row.

During normal operations, switches 46, 48 and 49 are all closed, relays R1 and R4 are energized, either relay R2 or R3 is energized depending upon the position of switch 56 and the circuits from the three phase power supply A, B, C to the motors 16, 16, 24 and 11 are completed through the overload relays 57. In addition, the energizing circuit for motor 11 also passes through the contacts of relay R2 or R3. Consequently, the cleaner

moves along the trackway 9 blowing the lint off the ceiling as well as all parts of the machine.

More particularly, with switches 46, 46 closed, solenoid 52 of relay R1 is energized between lines A and C of the power supply. This closes relay contacts 52a, 52b. Closure of relay contact 52a completes the energizing circuit for solenoid 55 of relay R4 between lines A and C of the power supply. Closure of contacts 55a on relay R4 completes a holding circuit for the solenoid 55 which passes through the four closed switches 48, 49 in series and through the normally closed contacts 57a in the four overload switches 57 to the line C thus bypassing the relay contacts 52a. Closure of contact 52b completes an energizing circuit from line A through contact 56a of switch 56 to one terminal of solenoid 53 of relay R2 and from the other terminal through closed relay contacts 55b of relay R4 and switches 48, 49 and the closed contacts 57a of the overload relays 57 to line C. Energization of relay R2 closes its relay contacts 53a, 53b and 53c thus completing the energizing circuit between the traction motor 11 and the power supply conductors A, B and C. If the switch 56 is in the position indicated by broken lines, relay R2 remains deenergized and the solenoid 54 of relay R3 becomes energized since the connection from conductor A is made through contact 56b. This causes relay R3 to pull in and likewise complete the energizing circuit for traction motor 11 through its contacts 54a, 54b and 54c but with two of the conductors B and C reversed so that the motor 11 runs in the opposite direction.

Should either of the trunks 26 now strike any obstruction in its path of movement along the frame, the trunk affected will be caused to move pivotally about its support as a result of the continued movement of the carriage 10 in the direction shown by the arrow in Fig. 5. Stud 36 moves with the trunk and rocks arm 32' clockwise to release the nose from support of the switch contact operator 45 after the trunk has moved about 3°. Switch operator 45 is now permitted to drop to the position shown in Fig. 5 thus opening the contacts of one of the switches 46 and hence also the energizing circuit to solenoid 52 of relay R1. As relay R1 becomes deenergized, its contact 52b opens thus deenergizing solenoid 53 of relay R2. Contact 52c of relay R1, however, closes and thus completes through contact 56c the energizing circuit to solenoid 54 of relay R3. The result is to reverse the direction of rotation of traction motor 11 and hence the carriage drive wheels 12. However, due to momentum of the carriage, the latter does not come to an instantaneous standstill but rather is braked abruptly by the reversely rotating wheels 12. Relay R4 is not deenergized at this time by the opening of relay contact 52a because of the holding circuit completed through contacts 55a. This holding circuit is broken later as switch 49 opens.

When the trunk 26 reaches the angular position shown in Fig. 6, about 10° from vertical, switch 49 is actuated by the arm extension 33' thus opening the circuit from conductor C to the common connection to one terminal of the solenoids 53, 54 of relay R2 and R3. Relay R3 which had been energized drops out thus disconnecting the traction motor 11 from the line conductors A, B, C. The carriage 10 will now have been brought to a stop and will remain stopped until the obstruction is removed. At this time all relays R1, R2, R3 and R4 are deenergized.

When the obstruction is removed and the trunk 26 has slowly swung back to its vertical position because of the pneumatic checking device 40, switches 49 and 46 will be reclosed, thus reenergizing relays R1, R2 and R4 to restart the traction motor and carriage in its original direction.

The same operational sequence will take place if the carriage is traveling in the opposite direction and strikes an obstruction except that arm 32 will be rotated as the

trunk pivots in the opposite direction to let the switch operator 45 drop and switch 48 will be actuated instead of switch 49.

In the embodiment which has been described, the carriage 10 is braked to a standstill by reversing the wheels 12. Another practical way in which to brake the carriage 10 is to open the traction motor circuit and simultaneously apply a brake. An arrangement for doing this is shown in the partial circuit diagram of Fig. 9. There it will be seen that the traction motor 11' is supplied with its 3 phase power through two-pole switches 61, 61 connected in series in the leads from two of the three supply conductors. These switches correspond to switches 46, 46 in location and function. Consequently, as soon as one of the trunks 26 strikes an obstruction and swings about its pivot axis, the appertaining switch 61 opens its contacts thus cutting off the current to traction motor 11'. Included with the motor 11' is a magnetic braking device 63 which applies a braking effect to the motor shaft as soon as the energizing circuit to the motor is interrupted. The braking principle per se is not part of the present invention and hence has not been illustrated since various types are commercially available. In general, these include a spring loaded braking member operable on the motor shaft as soon as the motor current is interrupted. Release of the brake is obtained magnetically when the motor current is reapplied. Consequently, in principle, the control systems of Figs. 8 and 9 are alike. That is to say, whenever one of the trunks 26 strikes an obstruction and is caused to pivot, the carriage 10 is brought to a standstill by application of a braking force. As soon as the obstruction is removed and the trunk returns to its normal vertical position, the carriage 10 is automatically restarted in the same direction.

In conclusion it is to be understood that various changes may be made in the embodiments which have been described and illustrated without, however, departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A traveling cleaner for textile machines comprising a motor driven carriage supported for longitudinal movement along the machine at a level above the machine, a blower unit on said carriage, an air trunk, movable relative to said carriage, extending from said blower unit downwardly along the side of said machine, means responsive to and actuated by movement of said trunk upon striking any obstruction in the path of movement thereof for braking said carriage to a standstill, and means responsive upon restoration of said trunk to its original position upon removal of the obstruction for restarting said carriage in the same direction.

2. A traveling cleaner for textile machines comprising a motor driven carriage supported for longitudinal movement along the machine at a level above the machine, a blower unit on said carriage, an air trunk extending from said blower unit downwardly along the side of said machine, said trunk being pivotally supported for pivotal movement in its plane of travel upon striking any obstruction in its path, means actuated upon pivotal movement of said trunk in response to striking an obstruction for braking said carriage to a standstill at the obstruction and means responsive to restoration of said trunk to its original position for restarting said carriage in the same direction.

3. A traveling cleaner for textile machines comprising a motor driven carriage supported for longitudinal movement along the machine at a level above the machine, a blower unit on said carriage, an air trunk extending from said blower unit downwardly along the side of said machine, said trunk being pivotally supported for pivotal movement in its plane of travel upon striking any obstruction in its path, switch means responsive to and actuated by pivotal movement of said trunk upon striking

7

an obstruction for braking said carriage to a standstill at the obstruction and deenergizing said carriage motor and for reenergizing said carriage motor in the same direction upon removal of the obstruction and restoration of said trunk to its original position.

4. A traveling cleaner as defined in claim 3 wherein said switch means includes one switch actuated by an initial pivotal movement of said trunk in either direction to reverse said carriage motor and a second switch actuated upon further movement of said trunk to deenergize said carriage motor.

5. A traveling cleaner as defined in claim 3 and which further includes a motor checking device retarding return movement of said trunk to its normal vertical position.

6. A traveling cleaner as defined in claim 3 wherein said switch means functions to deenergize said carriage motor and simultaneously apply a braking force to said carriage as said trunk is moved from its normal vertical position and vice versa.

8

7. A traveling cleaner as defined in claim 3 wherein said switch means are actuated by pivotal movement of said trunk in either direction from its normally vertical position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,935,158	Lumley	Nov. 14, 1933
2,524,797	Holtzclaw	Oct. 10, 1950
2,635,275	Holtzclaw	Apr. 21, 1953

FOREIGN PATENTS

722,755	France	Jan. 5, 1932
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OTHER REFERENCES

Textile World, March 1957, advertisement by Parks-Cramer, page 91.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,886,843

May 19, 1959

Agnew H. Bahmson, Jr.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, line 13, for "a motor checking" read -- a motion checking --.

Signed and sealed this 29th day of September 1959.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents